CLAIMS:

1. A fatty acid or fatty acid ester composition comprising one or more unsaturated fatty acids or unsaturated fatty acid esters, characterized as comprising less than 3.0 milliequivalents of metathesis catalyst poison(s) per kilogram of fatty acid or fatty acid ester composition.

2. The fatty acid or fatty acid ester composition of Claim 1 comprising less than about 2.5 meq/kg of metathesis catalyst poison(s).

3. The fatty acid or fatty acid ester composition of Claim 1 comprising less than about 1.0 meq/kg of metathesis catalyst poison(s).

4. The fatty acid or fatty acid ester composition of Claim 1 wherein the metathesis catalyst poison comprises one or more organic hydroperoxides.

5. The fatty acid or fatty acid ester composition of Claim 1 comprising greater than about 70 weight percent unsaturated fatty acid(s) and/or unsaturated fatty acid ester(s).

6. The fatty acid or fatty acid ester composition of Claim 5 wherein the unsaturated fatty acid is oleic acid, or the unsaturated fatty acid ester is an ester of oleic acid.

7. The fatty acid ester composition of Claim 6 wherein the unsaturated fatty acid ester is the methyl ester of oleic acid.

8. The fatty acid ester composition of Claim 1 being prepared by transesterifying a seed oil with a C_{1-8} alkanol to form a mixture of fatty acid esters of the C_{1-8} alkanol, and thereafter contacting the mixture of esters of C_{1-8} alkanol with an adsorbent under adsorbent conditions sufficient to remove organic hydroperoxides to a concentration less than 3.0 meq/kg.

9. The fatty acid composition of Claim 1 being prepared by hydrolyzing a seed oil to obtain a mixture of one or more unsaturated fatty acids, and thereafter contacting the

mixture of one or more unsaturated fatty acids with an adsorbent to remove organic hydroperoxides to a concentration of less than 3.0 meq/kg.

10. The fatty acid or fatty acid ester composition of Claim 8 or 9 wherein the adsorbent is selected from the group consisting of aluminas, silicas, activated carbons, clays, magnesias, aluminosilicates, molecular sieves, titanosilicates, and mixtures thereof.

11. An olefin metathesis process comprising contacting a feedstock composition derived from a seed oil and comprising one or more unsaturated fatty acids or unsaturated fatty acid esters with a lower olefin in the presence of a metathesis catalyst under metathesis process conditions sufficient to prepare a reduced chain olefin and a reduced chain unsaturated acid or unsaturated ester, the feedstock composition characterized as being essentially free of poison(s) capable of inhibiting the metathesis catalyst.

12. The process of Claim 11 wherein the feedstock composition comprises less than about 25 meq hydroperoxides per kg feedstock composition.

13. The process of Claim 12 wherein the feedstock composition comprises less than about 3.0 meq hydroperoxides per kg feedstock composition.

14. The process of Claim 13 wherein the feedstock composition comprises less than about 1.0 meq hydroperoxides per kg feedstock composition.

15. The process of Claim 11 wherein the feedstock composition comprises greater than about 70 weight percent unsaturated fatty acid(s) or unsaturated fatty acid ester(s).

16. The process of Claim 15 wherein the feedstock composition comprises greater than about 70 weight percent oleic acid or oleic acid ester(s).

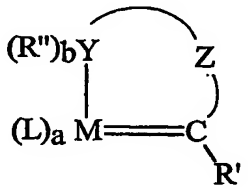
17. The process of Claim 11 wherein the feedstock composition is obtained by transesterifying a seed oil with a C_{1-8} alkanol to obtain a mixture of fatty acid esters of the C_{1-8} alkanol, and optionally purifying the mixture of fatty acid esters of C_{1-8} alkanol by

contacting the mixture with an adsorbent under conditions sufficient to remove organic hydroperoxides to a concentration less than about 100 meq/kg.

18. The process of Claim 11 wherein the feedstock composition is obtained by hydrolyzing a seed oil with water to obtain a mixture of fatty acids, and optionally contacting the mixture of fatty acids with an adsorbent under conditions sufficient to remove organic hydroperoxides to a concentration less than about 100 meq/kg.

19. The process of Claim 11 wherein the metathesis is conducted in the presence of a transition metal organophosphorus complex catalyst.

20. The process of Claim 19 wherein the metathesis catalyst is selected from the group consisting of dichloro-3,3-diphenylvinylcarbene-bis(tricyclohexylphosphine)ruthenium (II), bis(tricyclohexylphosphine)benzylidene ruthenium dichloride, bis(tricyclohexylphosphine)benzylidene ruthenium dibromide, tricyclohexylphosphine[1,3-bis(2,4,6-trimethylphenyl)-4,5-dihydroimidazol-2-ylidene][benzylidene]ruthenium dichloride, tricyclohexylphosphine[1,3-bis(2,4,6-trimethylphenyl)-4,5-dihydroimidazol-2-ylidene][benzylidene]ruthenium dibromide, tricyclohexylphosphine[1,3-bis(2,4,6-trimethylphenyl)-4,5-dihydroimidazol-2-ylidene][benzylidene]ruthenium diiodide, and the chelated ruthenium complexes represented by the following formula:



wherein M is Ru; each L is independently selected from neutral and anionic ligands in any combination that balances the bonding and charge requirements of M; a is an integer from 1 to about 4; R' is selected from hydrogen, straight-chain or branched alkyl, cycloalkyl, aryl, and substituted aryl radicals; Y is an electron donor group of an element from Group 15 or 16 of the Periodic Table; each R" is independently selected from hydrogen, alkyl, cycloalkyl, aryl, and substituted aryl radicals sufficient to satisfy the valency of Y; b is an

integer from 0 to about 2; and Z is an organic diradical that is bonded to both Y and the carbene carbon (C) so as to form a bidentate ligand, which ligand in connection with the M atom forms a ring of from about 4 to about 8 atoms.

21. The process of Claim 11 wherein the lower olefin is selected from C_{2-5} olefins.

22. The process of Claim 11 wherein the reduced chain olefin is a reduced chain α-olefin, and the reduced chain unsaturated ester is a reduced chain α,ω-unsaturated ester.

23. The process of Claim 22 wherein the reduced chain α-olefin is 1-decene, and the reduced chain α,ω-unsaturated ester is methyl 9-decenoate.

24. A process of preparing a polyester polyepoxide comprising (1) contacting a feedstock composition derived from a seed oil comprising one or more unsaturated fatty acids or fatty acid esters with a lower olefin in the presence of an olefin metathesis catalyst under metathesis process conditions sufficient to prepare a reduced chain unsaturated acid or reduced chain unsaturated ester; the feedstock composition being characterized as being essentially free of poison(s) capable of inhibiting the metathesis catalyst; (2) (trans)esterifying the reduced chain unsaturated acid or ester with a polyol under (trans)esterification conditions sufficient to prepare a polyester polyolefin; and (3) epoxidizing the polyester polyolefin with an epoxidizing agent, optionally, in the presence of an epoxidation catalyst, under epoxidation conditions sufficient to prepare a polyester polyepoxide.

25. The process of Claim 24 wherein the fatty acid ester feedstock composition is obtained by transesterifying a seed oil with a C_{1-8} alkanol to form a mixture of fatty acid esters of the C_{1-8} alkanol, and optionally contacting the mixture of fatty acid esters with an adsorbent under conditions sufficient to remove organic hydroperoxides to a concentration less than about 100 meq/kg feedstock composition.

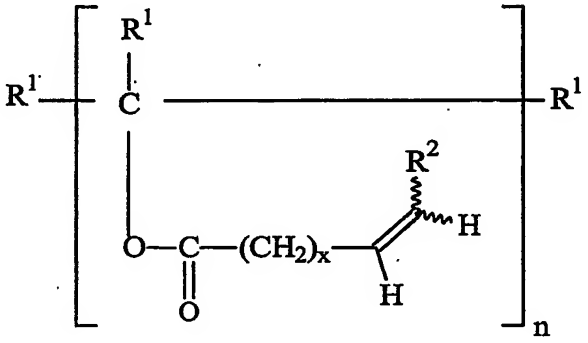
26. The process of Claim 24 wherein the fatty acid feedstock composition is obtained by hydrolyzing a seed oil with water to obtain a mixture of fatty acids, and optionally

contacting the mixture of fatty acids with an adsorbent under conditions sufficient to remove organic hydroperoxides to a concentration less than about 100 meq/kg feedstock composition.

27. The process of Claim 24 wherein the lower olefin is ethylene.

28. The process of Claim 24 wherein the olefin product is an α-olefin, and the unsaturated ester is an α,ω-unsaturated ester.

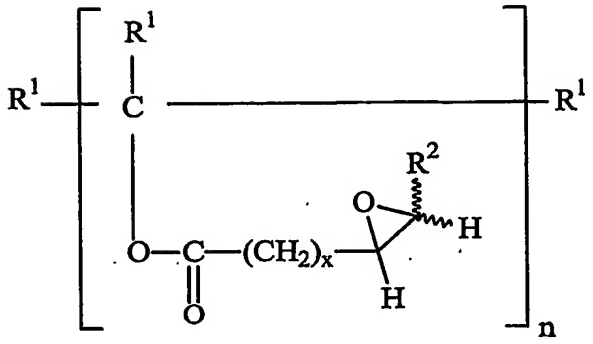
29. A polyester polyolefin composition represented by the formula:



wherein each R^1 is independently selected from hydrogen and C_{1-8} alkyl radicals; R^2 is selected from hydrogen, methyl, ethyl, and vinyl radicals,; x is an integer from about 3 to about 7; and n is an integer from 2 to about 15.

30. The composition of Claim 29 wherein each R^1 and R^2 is hydrogen, x is 7, and n is 3, and the composition consists essentially of the triglyceride ester of 9-decenoic acid.

31. A polyester polyepoxide composition represented by formula:



wherein each R^1 is independently selected from hydrogen and C_{1-8} alkyl radicals; R^2 is selected from hydrogen, methyl, ethyl, and vinyl radicals; x is an integer from about 3 to about 7; and n is an integer from 2 to about 15.

32. The composition of Claim 31 wherein each R^1 and R^2 is hydrogen, x is 7, n is 3, and the composition consists essentially of the triglyceride ester of 9,10-epoxydecanoic acid.

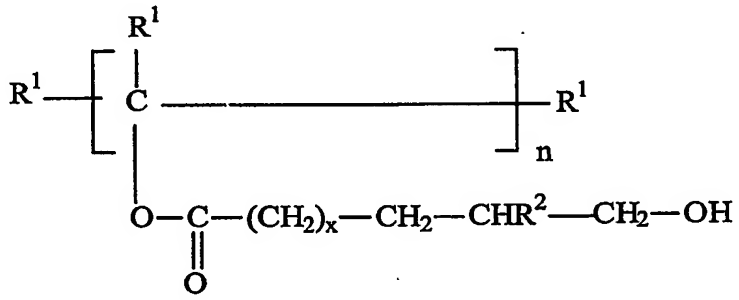
33. A process of preparing a reduced chain α,ω-hydroxy acid, α,ω-hydroxy ester, and/or α,ω-diol comprising (1) contacting a feedstock composition comprising one or more unsaturated fatty acids or fatty acid esters with a lower olefin in the presence of an olefin metathesis catalyst under process conditions sufficient to prepare a reduced chain unsaturated acid or ester; the feedstock composition characterized as being essentially free of poison(s) capable of inhibiting the metathesis catalyst; and (2) subjecting the reduced chain unsaturated acid or ester to hydroformylation with reduction in the presence of a hydroformylation/reduction catalyst under hydroformylation/reduction conditions sufficient to produce an α,ω-hydroxy acid, an α,ω-hydroxy ester, and/or an α,ω-diol.

34. The process of Claim 33 wherein the fatty acid ester feedstock composition is obtained by transesterifying a seed oil with a C_{1-8} alkanol to form a mixture of fatty acid esters of the C_{1-8} alkanol, and optionally contacting the mixture of fatty acid esters with an adsorbent under conditions sufficient to remove organic hydroperoxides to a concentration less than about 100 meq/kg.

35. The process of Claim 33 wherein the lower olefin is ethylene.

36. The process of Claim 33 wherein the α,ω-hydroxy acid or α,ω-hydroxy ester is (trans)esterified by contact with a polyol under (trans)esterification conditions sufficient to prepare an α,ω-polyester polyol.

37. An α,ω-polyester polyol composition represented by formula:



wherein each R^1 is independently selected from hydrogen and C_{1-8} alkyl radicals; R^2 is selected from hydrogen, methyl, ethyl, and vinyl radicals; x is an integer from about 3 to about 7; and n is an integer from 2 to about 15.

38. The composition of Claim 37 wherein each R^1 and R^2 is hydrogen, x is 7, and n is 3; and the composition consists essentially of the triglyceride of 11-hydroxyundecanoic acid.

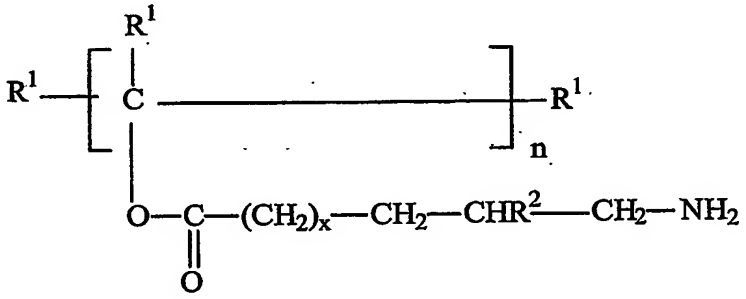
39. A process of preparing a reduced chain α,ω-amino acid, α,ω-amino ester, and/or α,ω–amino alcohol comprising (1) contacting a feedstock composition comprising one or more unsaturated fatty acids or fatty acid esters with a lower olefin in the presence of an olefin metathesis catalyst under process conditions sufficient to prepare a reduced chain unsaturated acid or ester; the feedstock composition being characterized as being essentially free of poison(s) capable of inhibiting the metathesis catalyst; and thereafter (2) subjecting the reduced chain unsaturated acid or ester to hydroformylation with reductive amination in the presence of a hydroformylation catalyst under hydroformylation/reductive amination conditions sufficient to produce an α,ω-amino acid, an α,ω-amino ester, and/or an α,ω-amino alcohol.

40. The process of Claim 39 wherein the feedstock composition is obtained by transesterifying a seed oil with a C_{1-8} alkanol so as to form a mixture of fatty acid esters of the C_{1-8} alkanol, and optionally contacting the mixture of fatty acid esters with an adsorbent under conditions sufficient to remove organic hydroperoxides to a concentration less than about 100 meq/kg.

41. The process of Claim 39 wherein the lower olefin is ethylene.

42. The process of Claim 39 wherein the α,ω-amino acid or α,ω-amino ester is (trans)esterified by contacting the α,ω-amino acid or ester with a polyol under (trans)esterification conditions sufficient to prepare an α,ω-polyester polyamine.

43. An α,ω-polyester polyamine composition represented by formula:



wherein each R^1 is independently selected from hydrogen and C_{1-8} alkyl radicals; R^2 is selected from hydrogen, methyl, ethyl, and vinyl radicals; x is an integer from about 3 to about 7; and n is an integer from 2 to about 15.

44. The composition of Claim 43 wherein each R^1 and R^2 is hydrogen, x is 7, n is 3; and the composition consists essentially of the triglyceride of 11-aminoundecanoic acid.